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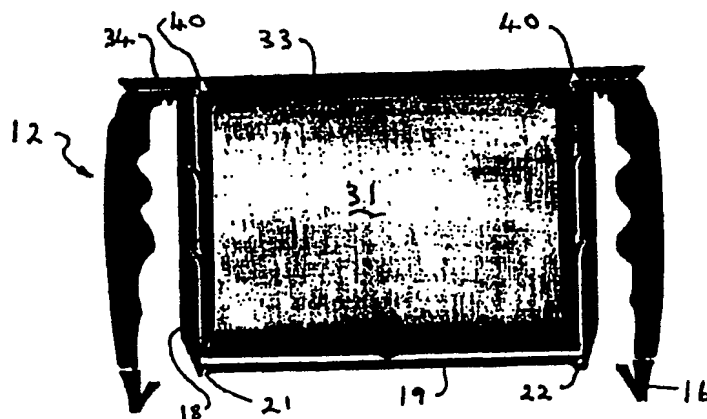
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(54) Title: IMPROVEMENTS IN CLOSURES FOR CONTAINERS



(57) Abstract

A closure for a container has a body (12) which includes a compartment (17) defined by side and bottom walls (18 and 19). The bottom wall (19) is frangible, preferably having a weakened edge portion (21). A capsule engages within the compartment (17) and is adapted to contain a material to be dispensed. The capsule (31) has a lower edge (37) which, on relative movement of the capsule (31) and compartment (17), breaks open the bottom wall (19) to dispense the capsule contents into the container to which the closure is fitted.

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IMPROVEMENTS IN CLOSURES FOR CONTAINERS

Background of the Invention

This invention relates to an improved closure for containers and relates particularly to an improved cap or lid which facilitates the dispensing of a material
5 such as a liquid, solid, powder or granular material into the container.

The invention will be described with particular reference to a cap for a liquid container, such as a beverage container. However, it will be appreciated that the principals of the invention can be applied to any container closure to enable
10 two materials to be kept separate up to the moment of use and to then dispense and admix one of the materials into the contents of the container. Thus, the invention is applicable to dispensing colour pigments, in liquid or powder form or in capsules, into paints, cosmetic colouring material into a carrier, pharmaceuticals in liquid, powder, tablet or granule form into an appropriate medium for ingestion of the
15 pharmaceutical, chemicals, including catalysts, into an active ingredient, or any other combination of materials where it is necessary or desirable to selectively dispense one material or substance into another.

Description of Prior Art

A number of proposals have previously been made for containers to be constructed in a way that two products are maintained separated until the moment
20 of use at which time one product is admixed with the other in the container. Containers of this type have been proposed with closures which are used to effect the product separation and facilitate the introduction of one product into the other. However, the containers and closures previously proposed are relatively complicated. For example, in one proposal, a closure is formed of three parts, a
25 first part including a compartment to hold one product, the compartment being adapted to engage in the neck of the container, a second part which moves relative to the first part and has a cutting edge adapted to cut a bottom wall of the compartment to release the first product into the container, and a sealing cap which engages over the compartment and second part to seal the closure on the container.

30 Such a structure is relatively complicated and expensive to manufacture, requires the assembly of three separate parts as well as introduction of a product

into the compartment, and necessarily involves a number of separate actions in order to release the product in the compartment into the container.

It is therefore desirable to provide an improved container and closure therefore which obviates at least some of the disadvantages of the previously proposed
5 dispensing containers.

It is also desirable to provide an improved dispensing closure for containers whereby a material or substance in liquid, powder, solid, granular or other form is able to be quickly and easily dispensed into the product in the container.

It is also desirable to provide an improved dispensing closure for containers
10 which is simple and easy to produce, assemble and sealingly engage with the container.

It is also desirable to provide an improved dispensing closure for containers which is able to be manufactured using existing manufacturing equipment and tooling.

It is also desirable to provide an improved dispensing closure for containers, such as beverage bottles, which enables different additives, such as colourings and/or
15 flavourings, to be dispensed into a common base product in the container.

Summary of the Invention

According to one aspect of the invention there is provided a dispensing closure for a container including a container closure body having a compartment defined by
20 side and bottom walls, said bottom wall being frangible, the body being adapted to sealingly engage a container, and a capsule which engages within the compartment and is adapted to contain a material or substance to be dispensed, said capsule including means to break open the frangible bottom wall of the compartment to selectively dispense contents of the capsule into the container through an opening in the capsule,
25 and co-operative locating means on the capsule and the body resisting relative movement of the capsule away from the bottom wall.

Preferably, the opening in the capsule is an open lower end of the capsule, which is in the form of an inverted, cylindrical member.

Preferably, one or both of the capsule and the compartment is provided with
30 sealing means which seals the volume defined by the capsule and the bottom wall when the capsule is inserted into the compartment.

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In one preferred form of the invention, the inner surface of the side wall defining the compartment is provided with at least one annular groove, and the outer wall of the capsule is formed with at least one corresponding rib or projection which engages with the at least one groove to form the sealing means. In one
5 form, two ribs or projections are provided on the wall of the capsule, the ribs or projections being tapered outwardly to a circumferential edge, and extending in a direction away from the open end of the capsule. The rib or projection thereby resists forces which may tend to move the capsule from the compartment both by the engagement of the rib within the groove and by the tapered shape of the rib.

10 In one form of the invention, the lower edge of the side wall of the compartment is formed with one or more downwardly projecting teeth which are adapted to cut into the frangible bottom wall to facilitate the opening thereof when pressure is applied to the capsule in the compartment.

It is also preferred that the frangible bottom wall is formed with a weakened
15 peripheral edge which is able to be pierced and/or broken by the edge portion of the wall of the capsule upon application of pressure to the capsule in the compartment. The frangible bottom wall may be provided with a hinge point so that, when broken away, the hinge point holds the bottom wall to the side wall of the compartment to prevent the wall falling into the container contents.

20 Preferably, the capsule is formed with one or more wings which engage one or more corresponding recesses in the body of the closure and which constitute an anti-tamper device. In one form of the invention, the wings must be folded or broken from their normal position in the recess (s) prior to movement of the capsule from the sealed position within the compartment to the dispensed position
25 at which the frangible bottom wall of compartment has been broken away exposing the contents of the capsule to the container.

In a further aspect of the invention, the capsule and wall of the compartment may be provided with at least one pair of co-operating projection and groove extending generally longitudinally, the groove having at its outer end a section
30 extending circumferentially. The co-operating projection and groove acts to prevent relative movement of the capsule in the compartment until the capsule has

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been rotated so as to move the projection from the circumferential part of the groove to the longitudinal part of the groove at which position the capsule can then be moved longitudinally (axially) relative to the compartment.

It is also preferred that either one or both of the capsule and the container closure is formed with a locking mechanism which allows the capsule to be pushed
5 past the frangible bottom wall of the compartment but which prevents the capsule being returned into the compartment and, preferably, at the same time, seals between the capsule and the compartment side wall.

In order that the invention will be more readily understood, embodiments
10 thereof will now be described with reference to the accompanying drawings:

Description of the Drawings

Fig 1 is a partly cut-away, perspective view of a dispensing closure body in accordance with the invention;

Fig 2 is a cross-sectional, side elevational view of the closure body of Fig 1;

15 Fig 3 is a part cut-away view of a capsule in accordance with one aspect of the invention;

Fig 4 is a cross-sectional, side elevational view of the capsule of Fig 3;

Fig 5 is a part cut-away view of the assembly of the capsule and the closure body; and

20 Fig 6 is a cross-sectional, side elevational view of the assembly of Fig 5.

Description of the Preferred Embodiment

Referring to Fig 1, the dispensing closure illustrated is designed particularly for use on bottles having a threaded neck, such as a beverage bottle or the like. The closure comprises a cap body 12 having an internally threaded side wall 14,
25 the threads of which are adapted to engage corresponding threads on the bottle (not shown) to which the cap is to be fitted. An anti-tamper, breakable flange 16 extends from the lower edge of the side wall 14 in a known manner.

The cap body 12 is formed with an internal compartment 17 defined by a side wall 18 and a bottom wall 19. The compartment 17 is open at its upper end.
30 The bottom wall 19 is connected to the side wall 18 by a weakened edge portion 21 which enables the bottom wall 19 to be broken away from the connection with the

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side wall 18. A hinge 22 is located at one point on the side wall and bottom wall where the weakened edge portion 21 is discontinuous so that, when broken away, the bottom wall remains connected to the side wall by the hinge 22 and is prevented from falling into the container to which the cap is to be fitted.

5 At the upper end of the side wall 18 there is provided a downwardly extending, sealing rib 23 adapted to seal against the upper edge of the threaded neck of the container to which the cap is to be fitted. A second rib 24 may also be provided between the side wall 14 and the top wall 26 of the cap body 12. An inwardly extending, snap seal lock rib 27 extends inwardly from the top of the side
10 wall 18 of the compartment 17. In addition, co-operating lock seal grooves 28 are provided at at least two locations around the inner surface of the side wall 18 to engage with corresponding recesses or grooves 28 on the capsule as hereinafter described.

15 The top wall 26 of the cap body 12 is also formed with two diametrically opposed, radially extending grooves 29 for receiving projecting wings 34 as hereinafter described.

20 The cap body 12 shown in Figs 1 and 2 may be formed by moulding a synthetic plastics material in a known manner. One of the features of the present invention is that the cap body 12 can be formed using existing cap moulding machinery currently used in forming caps for containers. Such caps are generally formed with a downwardly projecting circular flange which can be extended to constitute the wall 18 of the present invention. Further, the closed top of a normal cap would be formed as the bottom wall 19 of the compartment 17. Consequently, a cap body 12 of the present invention is able to be manufactured for substantially
25 the same costs as the caps currently manufactured.

30 Referring to Figs 3 and 4, there is illustrated a capsule which is adapted to be engaged within the compartment 17 of the cap body 12. The capsule 31 is formed with a side wall 32 and an upper wall 33, the bottom of the capsule being open. The upper wall 33 is formed with a pair of wings 34 which act as an anti-tamper device as hereinafter described. The side wall 32 of the capsule 31 is formed with a pair of co-operating lock seal protrusions or ribs 36 which extend

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outwardly and upwardly and are adapted to engage the lock seal grooves 28 in the side wall 18 of the compartment 17.

Figs 5 and 6 illustrate the closure of this embodiment in an assembled condition in which the capsule 31 is engaged within the compartment 17. In the assembled position, the wings 34 engage within the grooves 29 of the top wall of the cap body 12. In one embodiment, the top wall grooves 29 are under cut so that the wings 34 snap into the grooves 29. In another arrangement, the wings are formed with nibs 39 which may be adapted to lock under a latch (not shown) in the top wall 26. Such nibs 39 may also be used to prevent the capsule being pushed all the way through the compartment and into the container.

In the assembled position, the lock seal ribs 36 engage within the grooves 28 to both seal the inner volume of the capsule 31 as well as to lock the capsule 31 into the compartment 17 and to prevent withdrawal thereof. The upper snap seal lock rib 27 snaps into a corresponding groove 35 in the upper edge of the side wall 32 of the capsule 31 to ensure that the capsule is securely retained in the compartment 17.

It will be seen that, in the assembled position, the capsule 31 is contained within the compartment 17 and is sealed therein by the sealing grooves 28 and corresponding ribs 36. The capsule is designed to contain a product to be dispensed, such as a solid material, a liquid, a powder, granules or any other form of material which may need to be dispensed from the capsule into the contents of the container to which the cap body is to be fitted. To effect the dispensing of the material, the wings 34 are folded upwardly along the fold line 40 out of the corresponding grooves 29. The capsule 31 is then able to be moved downwardly relative to the compartment 17 so that the lower edge 37 of the side wall 32, which is formed with a relatively sharp edge, is able to cut through the weakened edge portion 31 of the bottom wall 19 to cause the bottom wall to be broken away from the side wall 18. A protuberance or pointed tip 38 extending from the lower edge 37 of the side wall 32 pierces the weakened edge portion 21, and the weakened edge portion 21 is separated from the side wall 18 with a knife like action resulting from the sharpened, knife-like lower edge 37. If desired, a number of

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protuberances or tits 38 may be formed extending from the lower edge 37 of the side wall 32.

When the bottom wall 19 has been substantially completely separated from the side wall 18 except for the hinge portion 22, the separated bottom wall is able to fold downwardly to open the compartment 17. In this position, the contents of the capsule 31 are able to fall into the container to which the cap body 12 is fitted. The lock seal ribs 36 engage with the exposed lower edge of the side wall 18 to prevent the capsule being returned and to also provide a continuing seal to seal the contents of the container.

In a modified form of the invention, the capsule and/or the cap body may be formed so as to positively prevent the capsule being pushed into the container beyond a predetermined limit. This may be done by providing shouldered side walls of the compartment 17 and capsule 31.

The capsule 31 of this embodiment of the invention is also relatively simple and easy to manufacture and is economical to produce. The capsule 31 is of relatively simple construction, and its assembly with the cap 12 is easily performed mechanically, including the introduction of the appropriate material into the capsule prior to its assembly with the cap. Both parts may be formed of a synthetic plastics material, and by using the snap-seal rib 27 and undercut grooves 29 to receive the wings 34, the capsule is firmly held in its assembled position within the compartment 17.

It is also possible to provide an O-ring type seal (not shown) between the lower outer surface of the capsule 31 and the internal surface of the wall 18 to provide a liquid-tight seal which enables the capsule to be filled with a liquid material. Many other variations of the invention in its basic form may be provided to ensure appropriate sealing and locking of the capsule to the compartment 17. The seals provided between the capsule 31 and the cap 12 and between the cap 12 and the container to which it is fitted ensures that any carbonation in the container is retained. The materials used in the manufacture, and the thicknesses required in the walls of the cap and capsule are also sufficient to prevent gas diffusion occurring through the container cap. The invention, therefore, provides a simple

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dispensing cap and capsule combination which is simple and economical to manufacture, charge and incorporate onto an existing beverage or other container. The cap of the illustrated embodiment incorporates effective tamper indicators in the form of the wings 34. The

5 In use, containers may be sold with a choice of caps containing different additives, such as different flavourings, colourings and the like. Thus, a drink bottle may be sold with a choice of caps having different flavours. The dispensing cap of the invention may be used to dispense pharmaceuticals or other tablets, such as vitamin tablets, paint colours, catalysts for chemical reactions such as for
10 adhesives and a wide variety of other materials. The closure described herein is particularly adapted for beverage containers. However, closures may be designed in the forms of metal lids for containers of paint or the like.

 While the capsule and compartment therefor have been shown as substantially cylindrical, it will be appreciated that other shapes of compartments
15 and capsules may be used in the performance of this invention. Thus, the compartment may have a square or rectangular cross-section with a correspondingly shaped capsule to fit therein.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A dispensing closure for a container including a container closure body having a compartment defined by side and bottom walls, said bottom wall being frangible, the
 5 body being adapted to sealingly engage a container, and a capsule which engages within the compartment and is adapted to contain a material or substance to be dispensed, said capsule including means to break open the frangible bottom wall of the compartment to selectively dispense contents of the capsule into the container through
 10 an opening in the capsule, and co-operative locating means on the capsule and the body resisting relative movement of the capsule away from the bottom wall.

2. A dispensing closure according to claim 1 wherein the capsule is in the form of an inverted, cylindrical member, and the opening in the capsule is an open lower end of
 15 the capsule.

3. A dispensing closure according to claim 1 or claim 2 wherein one or both of the capsule and the compartment is provided with sealing means which seals the volume defined by the capsule and the bottom wall when the capsule is inserted into the
 20 compartment.

4. A dispensing closure according to any one of the preceding claims wherein an inner surface of the side wall defining the compartment is provided with at least one annular groove, and an outer surface of the capsule is formed with a co-operating rib which engages with the at least groove to form a seal between the compartment and the
 25 capsule.

5. A dispensing closure according to claim 4 wherein the rib is tapered and extends in a direction away from the bottom wall of the compartment.

6. A dispensing closure according to any one of the preceding claims wherein a lower edge of a side wall of the capsule is formed with one or more downwardly projecting teeth which are adapted to piece the frangible bottom wall.
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7. A dispensing closure according to any one of the preceding claims wherein the frangible bottom wall is formed with a weakened peripheral edge which is able to be pierced and/or broken by the edge portion of the wall of the capsule upon application of pressure to the capsule in the compartment.

5

8. A dispensing closure according to any one of the preceding claims wherein the frangible bottom wall is formed with a hinge point so that, when broken away, the hinge point holds the bottom wall to the side wall of the compartment.

10 9. A dispensing closure according to any one of the preceding claims wherein the capsule is formed with one or more wings which engage one or more corresponding recesses in the body of the closure.

10. A dispensing closure according to claim 9 wherein the wings formed so as to be folded or broken from their normal position in the recess prior to movement of the capsule relative to the compartment.

11. A dispensing closure according to any one of the preceding claims wherein the closure body has an inwardly projecting snap-lock rib which engages in a corresponding recess in an upper surface of the capsule to lock the capsule to the compartment.

12. A dispensing closure according to any one of the preceding claims wherein either one or both of the capsule and the container closure body is formed with a locking mechanism which allows the capsule to be pushed past the frangible bottom wall of the compartment but which prevents the capsule being returned into the compartment.

13. A dispensing closure according to claim 12 wherein the locking mechanism at the same time seals between the capsule and the compartment side wall.

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14. A dispensing closure according to any one of the preceding claims wherein the closure body and the capsule are formed with co-operating projection and grove means, said grove means having a first portion extending circumferentially and a second portion extending axially whereby said capsule must be rotated
5 relative to the body to move the projection from the first portion to the second portion before the capsule can be moved axially.

15. A dispensing closure substantially as hereinbefore described with reference to the accompanying drawings.

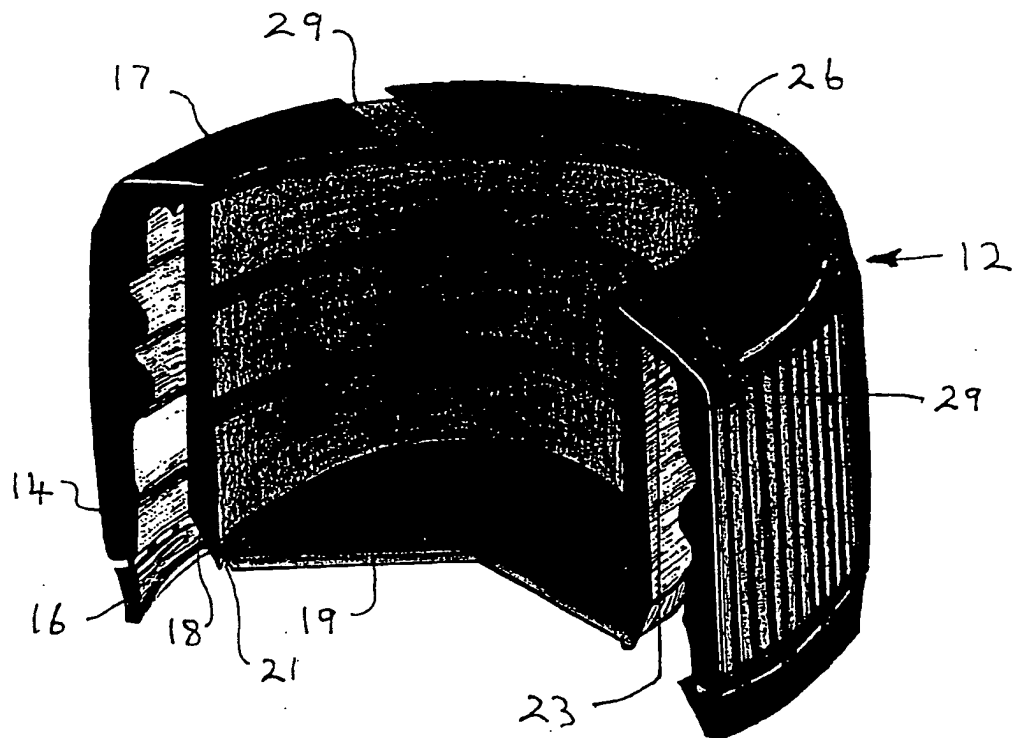


FIG 1

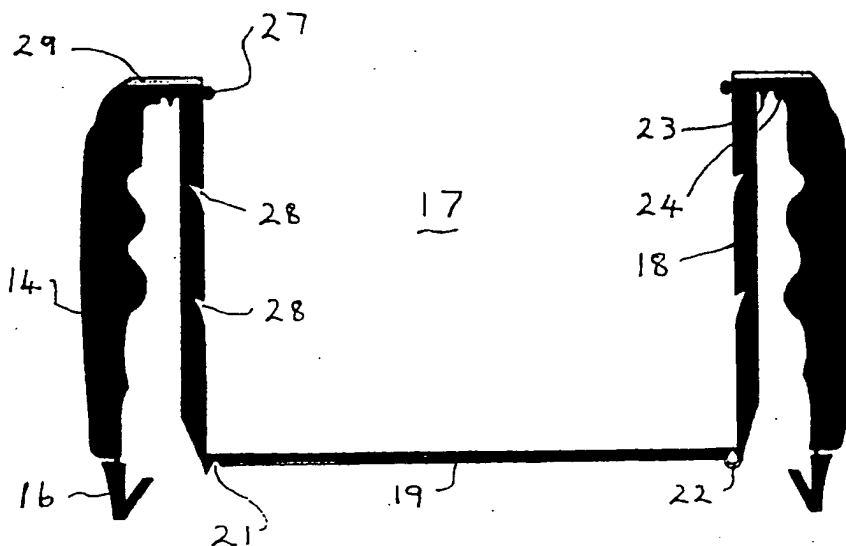


FIG 2

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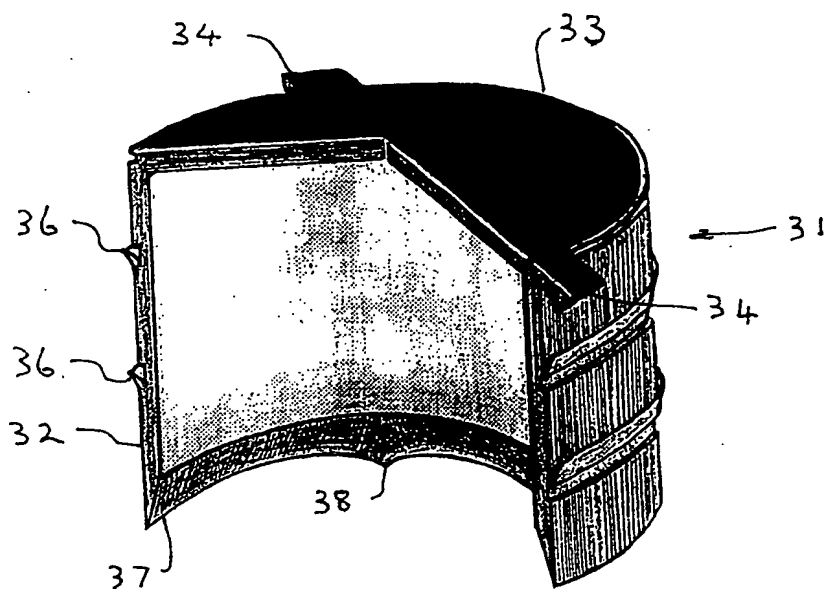


FIG 3

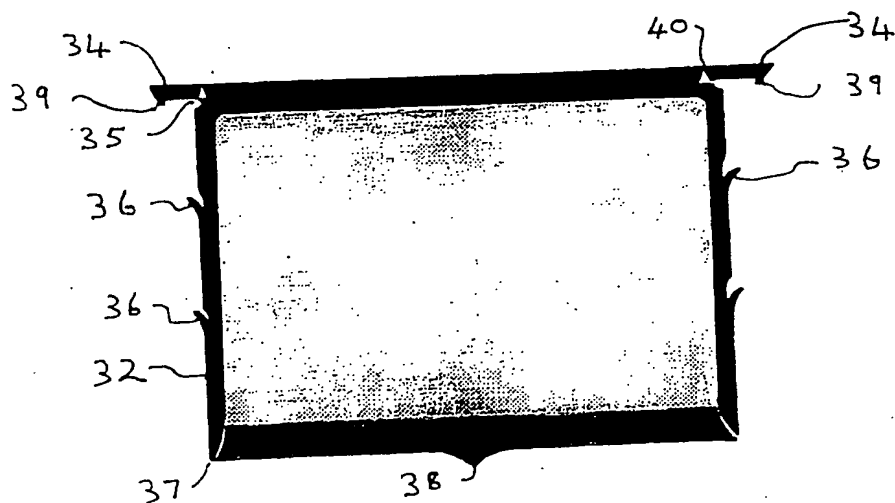


FIG 4

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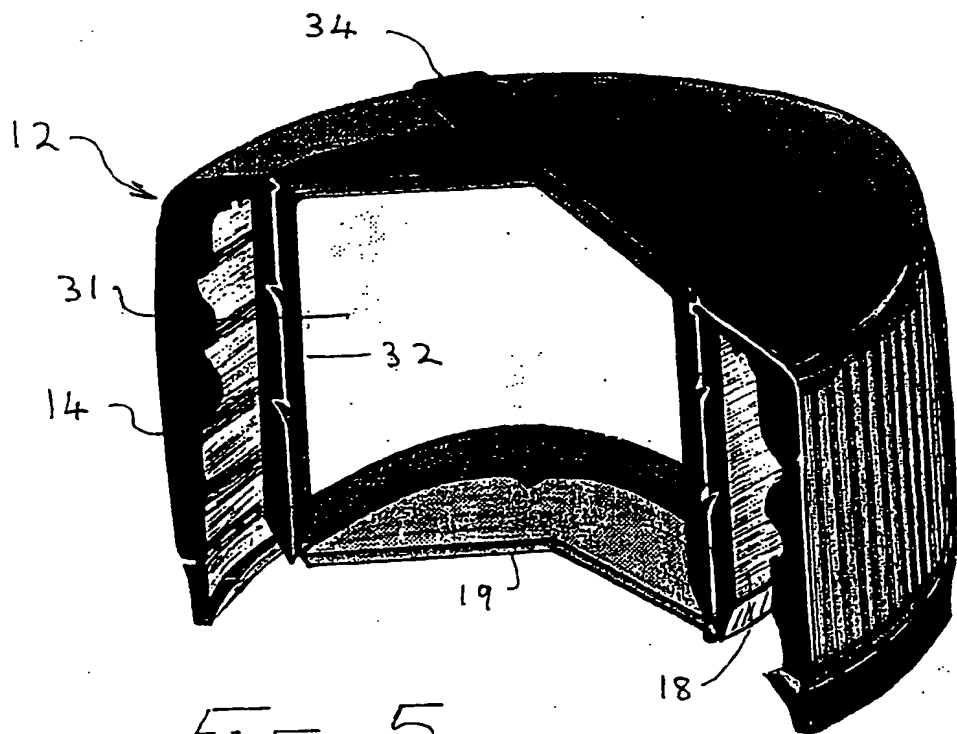


FIG 5

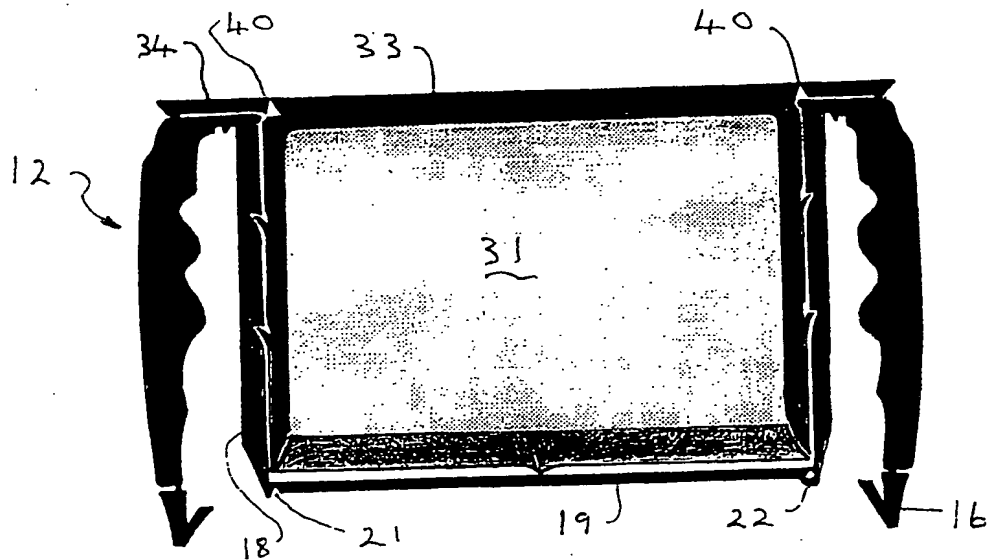


FIG 6

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